

Title (en)  
HEAT ENGINES WITH CASCADE CYCLES

Title (de)  
WÄRMEMOTOREN MIT KASKADIERENDEN ZYKLEN

Title (fr)  
MOTEURS THERMIQUES AVEC CYCLES EN CASCADE

Publication  
**EP 2550436 A4 20160420 (EN)**

Application  
**EP 11760095 A 20110322**

Priority  
• US 41777510 P 20101129  
• US 31650710 P 20100323  
• US 2011029486 W 20110322

Abstract (en)  
[origin: WO2011119650A2] Cascade thermodynamic energy conversion cycles use multiple power turbines in a working fluid circuit for conversion of waste heat energy, with each turbine inlet temperature optimized to operate in a temperature spectrum to use a greater amount of thermal energy from each cycle. Various accompanying recuperator arrangements are also disclosed, and working fluid mass management systems integrated with the cascade cycles.

IPC 8 full level  
**F01K 27/02** (2006.01); **F01K 23/04** (2006.01); **F01K 23/08** (2006.01); **F01K 23/16** (2006.01); **F01K 25/02** (2006.01); **F01K 25/10** (2006.01)

CPC (source: EP)  
**F01K 23/04** (2013.01); **F01K 25/10** (2013.01); **F01K 25/103** (2013.01); **Y02P 80/15** (2015.11)

Citation (search report)  
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• [Y] WO 2010017981 A2 20100218 - VOITH PATENT GMBH [DE], et al  
• [A] US 2005072182 A1 20050407 - TANIGUCHI HIROYOSHI [JP], et al  
• [A] EP 0286565 A2 19881012 - CARNOT SA [ES]  
• See references of WO 2011119650A2

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AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)  
**WO 2011119650 A2 20110929; WO 2011119650 A3 20120112**; BR 112012024146 A2 20170718; BR 112012024146 B1 20201222; CA 2794150 A1 20110929; CA 2794150 C 20180320; EP 2550436 A2 20130130; EP 2550436 A4 20160420; EP 2550436 B1 20190807

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**US 2011029486 W 20110322**; BR 112012024146 A 20110322; CA 2794150 A 20110322; EP 11760095 A 20110322